

Observations and Experiments on the Daily Variation of the Horizontal and Dipping Needles under a reduced Directive Power. By Peter Barlow, Esq. F.R.S. of the Royal Military Academy. Communicated by Davies Gilbert, Esq. V.P.R.S. Read June 12, 1823. [*Phil. Trans.* 1823, p. 326.]

By disposing magnets so as partly to counteract the influence of the earth's polarity on a magnetic needle, the author suspected that its daily variation might possibly exhibit itself in a very increased degree; and in experimentally prosecuting the idea, he found it to be the case to a very considerable extent in regard to the horizontal needle; and to take place also, though less satisfactorily, with the dipping-needle.

In the former experiment a finely suspended horizontal needle was used, the directive power of which was reduced by two magnets, properly placed for the purpose; a deviation of $3^{\circ} 15'$ was thus obtained at 11 A.M., which decreased to a late hour in the evening. The needle was kept in the same position for three days, with some change of directive power, with similar general results. After adverting to a difference in the direction of the variation in and out of doors, Mr. Barlow details the results of several experiments, which lead him to the following conclusions:—that while the north end of the needle is directed to any point from the S. to N.N.W., its motion during the forenoon advances towards the N.; and while directed towards any point between the N. and S.S.E. its motion is still to some point between the N. and N.N.W., so that there ought to be some direction between those limits in which the daily motion is a minimum: but whether this is a fixed direction during the year, or whether it has any vibratory motion as the sun changes its declination, is a question requiring further experiments to determine. Another conclusion which the author draws is, that the daily change is not produced by a general deflection of the directive power of the earth, but by an increase and decrease of attraction of some point between the N. and N.N.E., or between the S. and S.S.E.

The variation of the adjusted dipping-needle did not indicate the gradually increasing and decreasing power manifested by the horizontal needle; and although it evidently is subject to diurnal change, the law of that change remains to be determined.

On the Diurnal Deviations of the Horizontal Needle when under the influence of Magnets. By Samuel Hunter Christie, Esq. M.A. Fellow of the Cambridge Philosophical Society: of the Royal Military Academy. Communicated by Sir Humphry Davy, Bart. P.R.S. Read June 19, 1823. [*Phil. Trans.* 1823, p. 342.]

This paper contains a detailed account of a series of observations on the diurnal magnetic variation made upon the principle pointed out by Mr. Barlow, in his communication already before the Society. In regard, however, to the arrangement adopted by the author, it